Fermilab

DO Note 1064

DO Alarm Priorities

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In the DO Alarms and Monitoring System each alarm or event has a priority associated with it. This note outlines a system for assigning a priority with each device channel which is to be alarmed on.

The alarm priority, which is down-loaded to the Front End Processors, is an 8 bit number. The lowest priority value is 0 and the highest is FF Hex (256 decimal).

The priority values are divided into 16 different levels. For these 16 levels the two highest signal possible risk to personnel, the middle twelve signal risk to the hardware and or physics data, and the two lowest are informational.

The assignment of specific priority values to each alarm within the different levels initially is arbitrary. Future experience will enable fine tuning within the levels to balance the relative importance of each alarm.

Personnel Threatening

A personnel threatening alarm is for any condition which could endanger the safety of a person. Most if not all alarms which fall into this category are propagated through other channels than just the DO alarms processes. An example of such an alarm would be an electronics rack smoke detection alarm which is connected to the RMI. This alarm is routed to Firus as well as to the DO alarms process.

This category is divided into two subcategories. The higher priority category is a fire or smoke detection alarm. The next higher category is for all other personnel threatening conditions. One such condition could be a water leak which could lead to an electrical short.

Hardware and Physics Data

The alarms are next divided into three broad categories which are each further divided into four subcategories. The highest priority of these three categories is for hardware threatening conditions. The next category is for conditions which imply that any physics data being taken is degraded. The third category is for conditions that imply that any physics data being taken would be compromised.

Within each of these three broad categories are four subcategories. The first subcategory is for those conditions which effect a large part of a major system. Conditions which would effect over 25% of the channels for the central tracking system for example. The second subcategory is for those conditions which effect some part of a major system. The third subcategory is for the case where a large part of a minor or calibration system is effected. The forth subcategory is for the case where a small part of a minor or calibration system is effected.

A hardware threatening condition implies that a problem may exist which if uncorrected could cause damage to a hardware device. An over current trip on a power supply for example could imply a short in the powered devices which could damage the supply.

A physics data degraded condition implies that because of the alarmed on condition of the hardware or software device, any physics data being acquired would probably be degraded. This is a broad category into which such conditions as a Calorimeter Pre-Amp power supply turned off would would fall if this meant that a significant portion of the calorimeter data is missing. Or the HV on a drift chamber tripped off would mean that tracking information for part of the detector is missing.

The third broad category is physics data compromised. This condition of the hardware or software device being alarmed on indicates that any data being acquired may be compromised. The data may need to be corrected before it can be included in a general analysis.

Informational

The lowest priority alarm messages are not alarms but informational messages that alert someone to changing conditions or are simply meant to be logged for future information. The higher priority informational messages are those which are of interest for a large part of the detector systems. The lower priority are those messages which are of interest to a small part of the the detector systems.

Priority Values

Table 1 lists the sixteen priority levels. The first column gives the range of numerical values in HEX for the alarm, the second column gives the title of the category and the third column gives some examples of the category.

Examples

Table 2 lists the priority values given to a sample device, a BLS low voltage power supply. For this device a single chases delivers several voltages to two BLS crates. The highest priority is the absence of an external interlock which turns off power to both crates. The other highest priority status values are for conditions which turn off all the voltages to one or both of the crates. The bulk of the status values and all of the analog values are in the mid range of priorities. Finally resetting and toggling of the Off/On via the controls system is given an informational priority so that these events are logged.

Table 3 lists the priority values given to the Rack Monitor Interfaces (RMI) for the platform calorimeter electronics racks. Four status bits are alarmed on. Two of them which indicate the presence of smoke and water in the electronics rack are in the personnel threatening category. The other two which signal a loss of cooling water or air flow are in the hardware threatening category. Also a reset to a RMI through the control system is in the informational category.

Table 1

DØ Alarms Priority Levels

Priority	Category	Description
F0 - FF	Personnel Threatening	Fire, Smoke detection
E0 - EF	Personnel Threatening	Gas alarms, ODH alarms, other
D0 - DF	Hardware Threatening	Large Part of Major system
C0 - CF	Hardware Threatening	Part of Major System
B0 - BF	Hardware Threatening	Large Part of Subsystem
A0 - AF	Hardware Threatening	Small Part of Subsystem
90 - 9F	Physics Data Degraded	Large Part of Major System
80 - 8F	Physics Data Degraded	Part of Major System
70 - 7F	Physics Data Degraded	Large Part of Subsystem, Calibration System
60 - 6F	Physics Data Degraded	Part of Subsystem, Calibration System
50 - 5F	Physics Data Compromised	Large Part of Major System
40 - 4F	Physics Data Compromised	Part of Major System
30 - 3F	Physics Data Compromised	Large Part of Subsystem, Calibration System
20 - 2F	Physics Data Compromised	Part of Subsystem, Calibration System
10 - 1F	Informational	Information of General Importance
00 - 0F	Informational	Information of Local Importance

Table 2

Calorimeter BLS Power Supply
Alarm Priority Values

Priority	Category	BLS PS Attribute
9A	Physics Data Degraded - Large Part	External Interlock lost
96		Breaker Off
95		PS in Local
94		PS off
92		Sub-Supply caused trip
4A	Physics Data Compromised - Part of	Most Digital Status
48		Most Analog Values
18	Informational	Device was Reset
14		Device was turned Off

Table 3

Rack Monitor Interface
Alarm Priority Values

Priority	Category	RMI Attribute
E8	Personnel Threatening	Smoke Detector Trip
E2		Water Detector Trip
C8	Hardware Threatening - Part of	Low Air Flow Trip
C6		Low Water Flow Trip
1D	Informational	The RMI was Reset